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Urban health and wellness in Indian context - A strategic approach in urban design

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Abstract

The transformation of man from a nomadic culture to a sophisticated being has brought him detached from his so called 'nature' to 'cubicle'. This withdrawal from nature and natural essence to artificial environment (prolonged use of urban built environment) has caused not only external changes to his environment, but also internally as like health challenges – Life style diseases. Several pathways have been identified in the research linking built environments with travel patterns, activity levels, vehicle emissions, body weight, and associated causes of death and disability in India. At this point it is highly recommended that we analyses the link between disease burdens of India and its causing factors, in an urban designer's perspective as it has created a curiosity in the wisdom of an urban designer. Thus we could arrive at a point from where we can judge these factors by disintegrating it into smaller parameters which are easier to be analyzed and in turn help us to optimize and to negate these ill effects. Though India has great traditional knowledge systems in health care sector and life style through teachings of great civilizations[1], latest studies in health sector reveal that, we have moved away from our culture and tradition and facing acute and chronic diseases including non-communicable diseases, infectious diseases and violence (mental disorders and injuries) Hence, there should be sincere effort to bridge the existing gap between urban development and health wellness urban design interventions..

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1. Introduction

Urbanization is one of the leading global trends of the 21st century that has significant impact on health. As per Census India 2001, 28.6 crore people live in urban areas. The urban population has increased to 37.7 crore in 2011[2].The factors influencing urban health include urban governance, population characteristics, the natural and built environment, social and economic development, services, health emergency management and food security. While cities can bring opportunities, they can also bring challenges for better health. Many of the people will live in megacities – with 7 out of 49 megacities worldwide being located in India already, making it a an area of mega-urbanization. In this context, India's urban population is facing a rapid transformation of health determinants – deteriorating environmental conditions, continuing social fragmentation, and overburdened urban infrastructure [3]. Today's cities and those of tomorrow are facing triple threat: infectious diseases like HIV/AIDS, TB, pneumonia, diarrheal diseases; non communicable diseases like asthma, heart disease, cancer and diabetes; and violence (mental health and injuries) including road traffic injuries. Indian cities also face serious challenges of Non-Communicable Diseases (NCD), infectious diseases, mental health and injuries (Road traffic injuries) which altogether be named as; acute& chronic diseases. This paper intended to introduce a theoretical framework of health and wellness in Indian context and an application tool from urban design perspective.

2. Back Ground

India's urban population is facing a rapid transformation of health determinants, urbanization and acute & chronic diseases are increasing. As per 12th five year plan, the disease control measures are predominantly on medical curative approach like substantial expansion and strengthening of the public sector health care system to meet the health needs of rural and urban areas, a series of prescription drugs reforms, promotion of essential, generic medicines, and making these universally available free of cost to all patients etc.[4]. But acute & chronic diseases like non-communicable diseases, Infectious diseases, mental health, and Injuries are controlled by; Increasing physical activity, adopting healthy life style, healthier environment, improving the built environment, unstable family environment and Transportation planning.

3. Methodology

The methodology adopted in such a way that, Initial study was conducted on the basis of Indian disease burden, health recommendations and corresponding urban design guidelines through secondary literature review and qualitative questioner survey. For this qualitative questioner survey I had selected 20 households (covering 100 populations). Urban health frame work and health wellness urban design theoretical framework are formulated by integration of literature review and the understanding from questionnaire survey. The major objectives to achieve the results are:-To understand human health hazards and mitigate measures caused by prolonged use of urban built environment.To propose effective urban design guidelines for the improvement of urban health in Indian cities through primary survey & review on design approach.To infer the city level diagnosing tools and precinct levelanalyzing and application tools for the prescribed study area.

4. Urbanization and disease burden of India

Chronic non-communicable diseases are a major contributor to the burden of disease in developed countries, and are increasing rapidly in developing countries like India. This is mainly due to demographic transitions and changing lifestyles of populations associated with urbanization. Chronic non-communicable diseases are largely due to preventable and modifiable risk factors such as, high blood cholesterol, high blood pressure, obesity; physical inactivity, unhealthy diet, tobacco use and inappropriate use of alcohol These factors result in various long-term disease processes, culminating in high mortality rates attributable to stroke, heart attack, tobacco- and nutrition-induced cancers, obstructive lung diseases and many others [5].

5. Urban health framework

Secondary study reveals that "Urban health frame work" includes acute &chronic disease and disease prone stage, direct and indirect disease causing factors, and health recommendation in diagrammatic form. For severe diseases stage health recommendations are of mainly medicine related but here counting the matter of preventive and curative approach for the entire health and wellness of the urban society and corresponding some health recommendations are discussed below.Physical activity: - Exercise and the benefits to health. There are two ways in which the medical profession can contribute to health benefits from exercise: Raising the overall participation rate in physical activity and hence reducing disease Prescribing exercises to manage illness and injury" [6].Diet:-"The food and drinking habit of people vary from place to place and these are largely influenced by the ambient biological wealth and environment"[1]. Use of tobacco and alcohol: -"Tobacco is a special case of preventable risk that disproportionately affects the poor."[7].Social:-"The term social capital includes factors like levels of active involvement in community organizations, levels of trust in others and levels of interaction that encourage cooperation for mutual benefit." [8]. Environmental: - "Air and water quality are directly affected by the built environment and have direct impacts on human health." [9]. Occupational: - "important work-related risk factors include pesticides, heavy metals, infectious organisms, and agents causing occupational asthma and chronic obstructive lung disease"[10].Movement network: - "Transport has a major impact on health and a transport systems development either enhance health or, conversely, increase health risks. The most familiar health risks of transport include exposure to air pollutants, noise emissions from motorized vehicles, and the risk of road traffic injury"[11,12,13,14, 15, 16, 17, and 18].

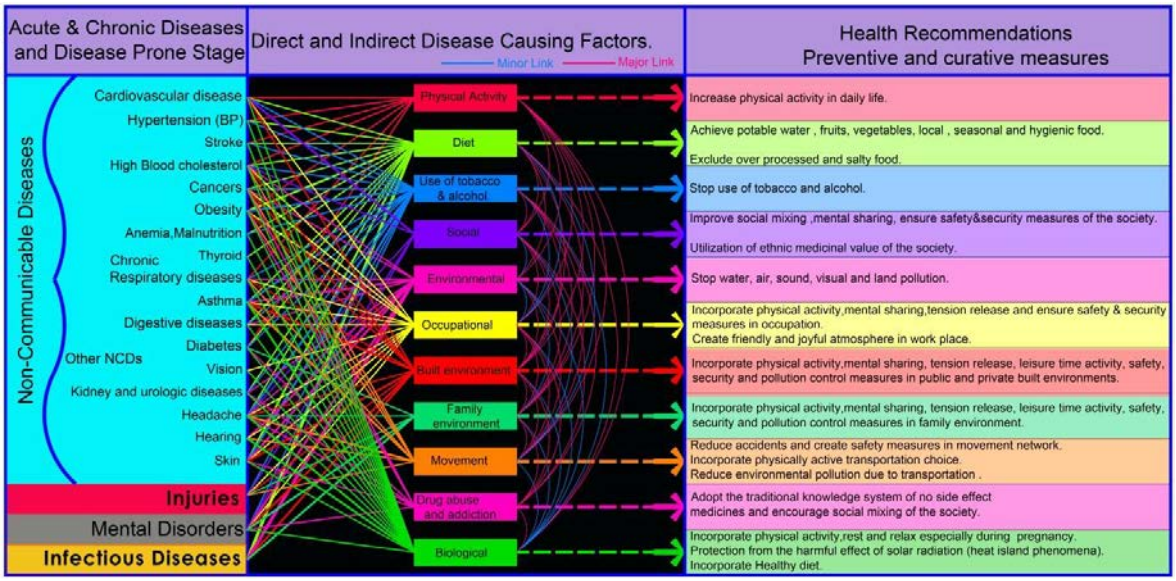

Fig. 1. Urban health framework

6. Health wellness urban design theoretical framework

Primary qualitative questionnaire survey and secondary studies reveals that "Health wellness urban design theoretical framework "includes health parameters are subdivided into urban design parameters and corresponding strategies are shown in Fig. 2. Author generated from the reference [19, 20, 21, 22, 23, and 24].Following detailed urban design parameters and corresponding strategies are inferred from studies which are to be implemented for urban health and wellness listed in hierarchical order.

HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
PHYSICAL ACTIVITY Increase physical activity	BUILT -OPEN	• Built-open inter relation to promote physically activity in built environment. • Children's and elder's physical activity area (includes indoor or outdoor) of 25 to 50 square meter courtyard/ balcony/ terrace area required for an individual household.
	QUALITY OPEN SPACE	• Children's physical activity area (includes indoor play, outdoor play, games, cycling, swimming and sports activities) of 2500 to 3000 square meters expecting 50 to 100 children required with in 100 to 150m from home. • Elder's Physical Activity Area (includes walking, Outdoor play, games ,cycling, swimming and sports activities) of 25,000to 50,000 square meters area expecting 1000 to 1500 people required with in 500 to 600m from home. • Requirement of indoor and out door area for sports, games and leisure time activities in offices and in educational institutions . Give importance for jogging paths, swimming pool, sports ground, cycle tracks to promote physical activity. • Quality open spaces to conduct group activities likes celebrations, spiritual activities , sport&games in regional scale city scale and in neighborhood to promote physical activity.
	PERIURBAN AGRICULTURE	• Household farm unit occupying either terrace or land to promote physical activity by working. • Small scale local group farming unit required with in 500m from home to promote physical activity by working.
	LOCAL MARKETS	• Local Market required within 500m from home promote walking (distance 1km to and fro).
	MOVEMENT NETWORK	• Comfortable streetscape with shaded trees along internal movement network in neighborhoods supporting walking, cycling, children's play to promote physical activity. • Incorporating origin and destination movement network in land use pattern in order to minimize travel distance and to support walking and cycling.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
DIET Potable water. Increase use of fruits, vegetables and hygienic food. Increase use of local,ethnic and seasonal food. Reduce use of over processed food with high sodium content.	PERIURBAN AGRICULTURE	• Household farm unit in terrace area or open land area . • Small scale group farming area required with in 500m from home. • Promote local organic farming. • Promote agriculture in land locked areas and other public open spaces by the support of Kudumbasree.
	ECOLOGY	• Conservation of Eco-Sensitivity (waterbody,Paddyand wet lands) ,Ground water conservation that is the backbone of food and security of that area.
	INTEGRATED MARKETS	• Local Market required within 500m from home that is the availability of fresh and local foods.
	INFORMAL COMMERCE	• Promote informal commerce which is a part of ethnic food system.
	MOVEMENT NETWORK	• Requirement of fruit bearing trees along streets to achieve fresh fruits and vegetables as a part of city beautification movement.
	WASTE MANAGEMENT	• Requirement of scientific methods of organic waste management system to support bio-fertilizer in neighborhood level.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
USE OF TOBACCO & ALCOHOL. Reduce use of tobacco. Reduce use of alcohol.	MOVEMENT NETWORK	• Integration of active streets with interlinked movement network in public areas supporting walking, cycling, group chat, informal commerce & eateries receiving max active living.
	INFORMAL COMMERCE	• Strict regulation in medical shops and informal commerce selling pan masala, brown sugar, cocaine etc to prevent use of tobacco and alcohol.
	ACTIVITY	• Measures to revitalize and to generate activity in hidden pocket areas by peacemaking or by activity generators. • Integration of pluralistic spaces which encourage leisure time activities likes celebrations, spiritual activities , sport&games etc.
	COMMUNITY LIVING	• Social integration of neighborhood by group housing units with no segregation of religion ,caste and income which supports healthy

HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
SOCIAL Increase social mixing of the society . Increase mental sharing attitude of the society. Improve safety and security of the society	QUALITY OPEN SPACE	• Integration of quality open spaces ,parks,etcwhich caters pluralistic activities like leisure time, celebrations, spiritual , sport&games etc in neighborhood level.
	MOVEMENT NETWORK	• Integration of interlinked movement network which promote social mixing. • Streetscape with shaded trees along internal movement network in neighborhoods supporting walking, cycling, children's play area which promote social integration.
	GROUP FARMING	• Small scale group farming unit with in the community area.
	ACTIVITY	• Measures to revitalize and to generate social activity in throughout the community areas by peacemaking or create activity generators.
	COMMUNITY LIVING	• Social integration of neighbourhood by group housing units with no segregation of religion ,caste and income which supports healthy community living .
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
ENVIRONMENTAL Reduce air pollution. Reduce water pollution. Reduce sound pollution. Reduce ground pollution.	CONSERVATION	• Conservation and pollution control measures towards natural resources like(rain water conservation, ground water conservation ,wetland conservation,paddy conservation etc).
	ECOLOGY	• Development plan should always consider the ecology in first priority.
	TRANSPORTATION	• Environmental friendly transportation system (mass transit). • Strict control over private vehicle population& traffic calming measures shall be adopted. • Incorporate origin and destination movement network in order to minimize travel distance and to support walking and cycling. • Pedestrian friendly movement networks in various scales from highways to internal pathways. • Cycle friendly movement networks in various scales from highways to internal pathways.
	BUILT	• Promote natural ventilation in all built up structures by improving indoor air quality through ventilation by increasing the no of doors and windows. • Strict regulation in construction activities to discourage massive and dense construction(concrete jungle). • Promote use of natural built materials and reduce use of plastic and other highly processed industrial materials in construction industry.
	LANDUSE	• Segregation of industrial area, aerodrome and hazardous activity areas in land use plan.
	WASTE MANAGEMENT	• Adopt scientific methods of waste management system in order to zero pollution concept.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
OCCUPATIONAL Incorporate work place physical activity. Improve work place mental sharing. Incorporate work place tension release measures. Create friendly and joyful workplace atmosphere. Provide occupational safety and security.	TRANSPORTATION	• Incorporating origin and destination movement network in land use pattern in order to minimize travel distance and to support walking and cycling. • Comfortable streetscape with shaded trees along movement network in public areas supporting walking,cycling to promote physical activity. • Provide Adequate safe transit interchange with in walkable distance to promote walking and cycling.
	QUALITY OPEN SPACE	• Requirement of quality open space for sports, games and leisure time activities (indoor and outdoor) associate with work place .
	BUILT -OPEN	• Adequate built open inter relation to promote physical activity and natural ventilation.
	TOURISM	• Tourism potential of the city shall be explored for spending leisure time activities.
	LOCAL RESOURCES	• Explore local resource in a sustainable manner to achieve occupational safety and security.

HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
BUILT ENVIRONMENT promote physically active built environment. Improve social mixing through built environment. Pollution control in built environment. Improve safety and security in the built environment. Associate tension release & leisure time activity in built environment. Improve visual quality of surrounding.	BUILT -OPEN	• Built open inter relation to promote physical activity and natural ventilation in built environment.
	MOVEMENT NETWORK	• Built associate with street network to support walking,cycling or to receive transit interchange point to promote safe and comfortable movement.
	QUALITY OPEN SPACE	• Built associate with open spaces which support recreation activiy, celebrations,promote physical activity etc.
	ECOLOGY	• Natural layer should associate with built environment in such a way that conservation of Eco-Sensitive areas like (Green cover, Existing flora fauna,waterbody,Paddy,wet land) and Ground water and topography .
	BUILT USE	• Built use restriction for hazardous activity.
	LAND USE	• Mixed Built use which create maximum social mix, safety and security. • Land use segregation for industrial area, aerodrome and hazardous activity.
	WASTE MANAGEMENT	• Scientific methods of waste management system in order to zero pollution concept.
	BUILT DENSITY	• Regulation in construction activities to discourage massive and dense construction(concrete jungle). Also provide at least 4m distance in between two built units.
	URBAN POCKETS	• Measures to revitalize & to generate activity in hidden unsafe pocket areas.
	TOURISM	• Tourism potential of the city shall be explored for leisure time activities.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
MOVEMENT Reduce road accident. Promote physically active transportation choice. Promote environmental friendly transportation choice.	PEDESTRIAN	• Pedestrian friendly movement networks in various scales from highways to internal pathways. • Safe pedestrian crossings. • Safe transit interchange point.
	ROAD NETWORK	• Road hierarchy as per traffic density,road width,type and speed of the vehicle. • Adequate interconnection to organize traffic segregation. • Dedicated routes for public transport,goods traffic and ambulance services .
	ORIGIN-DESTINATION	• Incorporate origin and destination movement network in order to minimize travel distance and to support walking and cycling.
	ECO-FRIENDLY TRANSPORTATION SYSTEM	• Cycle friendly movement networks in various scales from highways to internal pathways. • Environmental friendly transportation system (mass transit).
	TRAFFIC	• Strict control over private vehicle population& traffic calming measures shall be adopted.
	BUILT-OPEN	• Proper built-open relation to which support smooth traffic flow.
	QUALITY OPEN SPACE	• Adequate open space along roads which can carry mass and spontaneous movement of pedestrian.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
DRUG ABUSE AND ADDICTION Reduce prescription drug abuse and addiction attitude of the society. Preserve ethnic medicinal values of the society. Promote use of traditional knowledge system of medicines.	ACCESSIBILITY	• Easy accessibility to Govt. health infrastructure facilities. • Availability and awareness of traditional medicines does not have side effects (Ayurveda ottamooli).
	URBAN POCKETS	• Measures to revitalize & to generate activity in hidden unsafe pocket areas.
	CONSERVATION	• Conservation of medicinal plants and ecosystem (wetlands that is the ocean of medicinal plants)

HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
FAMILY ENVIRONMENT Promote physically active household and neighbourhood typologies. Promote mental sharing attitude in household and neighbourhoods. Pollution control measures in household and neighbourhoods. Incorporate tension release & leisure time activity in house hold and neighbourhoods.	BUILT -OPEN	• Built open inter relation to promote physical activity in house type and typology. • Children's and elder's activity area (includes indoor or outdoor) of 25 msq. to 50 msq. courtyard/ balcony/ terrace area required for an individual household.
	QUALITY OPEN SPACE	• Children's play area (includes indoor play, outdoor play, games ,cycling, swimming and sports activities) of 2500 msq.to 3000 msq. expecting 50 to 100 children required with in 100 m.to 150 m. from home. • Elder's Physical Activity Area (includes walking, Outdoor play, games ,cycling, swimming and sports activities) of 25,000 msq.to 50,000 msq. area expecting 1000 to 1500 people required with in 500 m. to 600 m. from home. • Quality open spaces to conduct group activities likes Children's play area, celebrations, spiritual activities in small housing clusters . • Open spaces and parks in neighborhood level and in city scale which promote increase family leisure time.
	PERIURBAN AGRICULTURE	• Household farm unit occupying either 50% terrace area or 50 msq. open area required for 5 cents and above plots. In case of apartments, provide 50 msq. open area and 50% of terrace area for each household .
	MOVEMENT NETWORK	• Small patch of land (pocket areas)which associated with internal streets to promote chit-chat, children's play etc. • Comfortable streetscape with shaded trees along movement network in neighborhood areas supporting walking,cycling and jogging .
	MORPHOLOGY	• Group housing with no segregation of religion, caste and income.
	BUILT REGULATIONS	• Restriction for bar and informal commerce selling pan masala etc very near to neighborhood. • Land use segregation for industrial area, aerodrome and hazardous activity away from residential landuse. • Strict regulation in construction activities to discourage massive and dense construction(concrete jungle). Max coverage for residential areas-50% and height restricted up to four floors (walkable).
	WASTE MANAGEMENT	• Scientific methods of waste management system in order to zero pollution concept in neighborhood level.
HEALTH PARAMETERS	URBAN DESIGN PARAMETERS	URBAN DESIGN STRATEGIES
BIOLOGICAL Protect the nature from harmful solar radiation. incorporate physical activity,rest and relax especially during pregnancy.	BUILT	• Promote natural built material,Lifecycle assessment for building materials and promote sustainable building typologies.
	ECOLOGY	• Give prime importance to natural layers while designing.
	CONSERVATION	• Conservation of ecosystem

Fig. 2. Health wellness urban design theoretical framework

7. Inference

City levelhealth and wellness diagnosing tools are:- Degradation of ecology leads to infectious diseases.Absence of urban open space and physically inactive morphology leads to non-communicable diseases. Vulnerable movement network leads to accidents and injuries. Absence of activity and social coherence leads to mental disorders.

Major urban design parameters and corresponding precinct levelanalyzing & application tools are:-Ecology: - Conservation of ecosystem (water bodies and wetlands), Flaura, fauna, medicinal plants groundwater etc. Urban open space: - Physical activity areas for all age groups (children, elders etc.),open space spatial hierarchy (city level

and neighborhood level), parks, playgrounds, imparting physical activity (cycling swimming etc.) and spiritual wellbeing.Morphology: - Built –open relationship to promote physical activity, ventilation, visual connectivity and social coherence. Use of natural built materials, sustainable building types etc. Built use segregation (hazardous activity), mixed use, social mix safety and security.Human scale built environment, walkability, density and form (medium density neighborhood to generate social life and access to nearby commercial, recreational, food and green space). Variety of dwelling size, cluster housing, space hierarchy (public space to private). Movement network: - Pedestrian friendly, non-polluting, energy efficient transportation system. Shaded walkways. Traffic calming measures, shortening of origin destination distances etc.Activity: - Improve leisure time activities. Integration of pluralistic spaces(spiritual celebrations and sports etc.). Revitalizing and generating activities in unsafe pocket areas.

Minor urban design parameters and corresponding precinct level analyzing& applications tools are:-Local resources:-Explore local resources in a sustainable manner to achieve occupational safety, security and free of environmental pollution.Peri-urban agriculture: - Hierarchy of farm units from households to city level (food security). Local market: - Availability of local seasonal foods with in walkable distance. Informal commerce: - Promote informal commerce for good foods to avoid over salted, oily and packet foods. Waste management:- Scientific methods for sustainable use of organic waste (bio fertilizers) to reduce communicable diseases. Land use:- Mixed land use which creates maximum social mix, safety and security. Land use segregation for industrial and hazardous activity. Community living: - Social integration of neighborhood units by group housing which promotes healthy social life.

8. Conclusion

Urban health framework, health wellness urban design frame work is perceived in a broader sense, when it comes to discussions on health challenges in a city scale. But it is generally seen that, any intervention is carried out in an ad-hoc manner focusing only on overcoming the present adversities in small time frame and small scale. Urban designers have to be sensitized towards a sustainable way of approaching urban health and wellness too whether it be creating built or un-built environment.

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